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Original Article

Evaluation of Public Awareness, Knowledge and Attitudes about Cardiopulmonary Resuscitation: Report of İzmir

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Abstract

Objective: Early initiation of cardiopulmonary resuscitation (CPR) by witnesses increases survival after cardiac arrest. In Turkey, our country, it is rare that basic life support (BLS) is initiated by a layperson. In our study, we aimed to use a survey to research awareness, level of knowledge and attitudes of the public to CPR and BLS.

Methods: A 21-question survey was administered to individuals aged ≥18 years on a busy street in a city of a western region of Turkey. Topics such as knowledge about cardiac arrest findings, previous experience of CPR, knowledge of BLS and concerns related to CPR were questioned.

Results: The fully completed forms of 533 people were evaluated. There were 40.7% who stated that they had received training in CPR. For signs of cardiac arrest, 40.7% answered loss of consciousness, 49.3% answered cessation of breathing and 60.7% answered cessation of circulation. It was found that 35.5% could perform only chest compressions, 27.6% could perform mouth-to-mouth ventilation and 28.7% able to perform both. While 52.0% knew the location for performing chest compressions, 34.3% knew the correct depth and 15.6% knew the correct compression–ventilation rate. Bystander CPR was performed by 3.6%.

Conclusion: In conclusion, 40.7% of people living in a highly educated region in the western part of Turkey had received CPR training and 3.6% performed bystander CPR. A majority of participants stated that they were willing to correct and develop their knowledge and skills related to CPR. Effective public CPR training programmes may increase the knowledge and awareness of CPR in the adult population.

Keywords: Cardiopulmonary resuscitation, cardiac arrest, attitudes, healthy knowledge, survey

Introduction

Sudden cardiac arrest is the main cause of death of millions of people worldwide every year (1). It is possible to save the lives of 50,000 people every year if cardiac massage is properly performed until help arrives. In Europe, 350,000 people lose their lives each year because of out-of-hospital sudden cardiac arrest (OHCA) (2). This number is predicted to be 60,000 in the UK (3). The number of OHCA cases in the US is approximately 300,000, and the mortality rate is 92% (4, 5). The OHCA data in Turkey is insufficient. The survival chance increases two fold if basic life support (BLS) is conducted by the first person to intervene and by the use of automated external defibrillators (AED) (6). Although the significance of cardiopulmonary resuscitation (CPR) is well understood, the rate at which such events are witnessed in many European countries is 37%, and the rate of CPR application to witnessed victims is 44%. Four percent of victims are treated with AED before an emergency team arrives (6, 7).

It has been indicated that CPR that was initiated early by witnesses increased survival after cardiac arrest (8-10). An important method to increase CPR success for cardiac arrest cases is to increase public knowledge and understanding of the practical applications of CPR. Intervention for a successful result after cardiac arrest is conceptualised as a chain. The chain is no stronger than its weakest link (11). There are many things that can also be done by people who have not received any health education for the first two links in this lifesaving chain. Studies examining the awareness, knowledge levels and attitudes of individuals in Turkey regarding CPR and BLS are limited.

In this study, the awareness, knowledge levels, attitudes and concerns of individuals living in İzmir, which is located in the western region of Turkey, regarding CPR and BLS were investigated using a questionnaire.

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Methods

This questionnaire study was initiated after receiving the ethics committee approval (Dokuz Eylül University Medical Faculty Non-invasive Clinical Studies Ethics Committee; protocol no: 1609-GOA, decision no: 2014/24-16). A questionnaire study involving 21 questions regarding cardiac arrest and actions to be taken was conducted; the questionnaire was targeted to reach at least 500 people over 18 years on a densely populated street in Izmir, which is the most developed city in the western region of Turkey.

The demographic features of the participants, their knowledge regarding cardiac arrest signs (cyanosis, difficulty in breathing, nausea, faintness of the skin and other findings), their previous CPR experiences (witnessing cardiac arrest, conducting CPR, having a CPR certificate), whether they know the national phone number for emergency situations, BSL knowledge (compression location, number and rate of ventilation/compression), their concerns regarding CPR (possibility of making a mistake, contracting a contagious disease from blood and vomit, legal concerns) and attitudes (people to whom they will give CPR without hesitation) were among the questions that the participants were asked (Appendix 1).

Correct cardiac arrest findings and algorithms of BLS were determined according to the European Resuscitation Council (ERC) 2010 Resuscitation Guideline (11).

Statistical analysis

The data were analysed with the Statistical Package for the Social Sciences 15.0 software package program (SPSS Inc. Chicago, IL, ABD). The data indicating frequency were displayed as a number (n) and percentage (%); the other data were displayed as mean±standard deviation. The chi-square test was used in the analysis of data indicating frequency. A p value of <0.05 in the examinations was accepted as significant.

Results

Demographic data: 533 questionnaire forms that were completely filled out from the 550 questionnaire forms gathered were assessed. The features of the participants are displayed in Table 1.

CPR training status: The rate of participants who stated that they received CPR training was 40.3%. A majority of these stated that they received training through courses given in their workplace (8.4%). The rate of those who received training during driving schools was 7.3%.

Knowing the signs of cardiac arrest: As cardiac arrest signs, 40.7% of participants responded with loss of consciousness, 49.3% responded with respiratory standstill and 60.7% responded with discontinuation of circulation. Other signs and findings of cardiac arrest included chest pain (38.6%), respiratory distress (31.3%), cyanosis (27.4%), faintness of skin (12.9%) and other (3.8%).

Recognizing cardiac arrest: The rate of knowledge regarding cardiac arrest signs was found to be significantly higher for those who received training than for those who did not receive training (p<0.004). It was observed that only eight people (1.5%) knew three of the cardiac arrest findings in the list and 24 (4.5%) knew two of them (Table 2). The rate of participants who witnessed a cardiac arrest was 18.6%; 2.4% of those who witnessed cardiac arrest performed cardiac compression, 1.5% conducted mouth to mouth ventilation and 3.6% both performed cardiac compression and conducted mouth to mouth ventilation (namely, they applied complete CPR) (Table 3).

CPR knowledge and skills: The rate of participants who knew how to perform cardiac massage in case of sudden cardiac arrest and respiratory standstill was 41.5%; the rate of participants who did not know to perform cardiac massage was 58.5%. Moreover, 35.5% of participants could only perform cardiac compression, 27.6% could only conduct mouth to mouth ventilation and 28.7% could perform both (Table 4). Of all participants, 52% knew the location of cardiac compression, 18.4% knew the rate, 34% knew the correct depth and 15.6% knew the correct ratio of compression/ventilation (Table 5).

Table 1. The demographic features of the participants

	Total n=533	**(%)**
Age (mean, year) (mean±SD)	36.85±12.12	
Gender (male/female)	318/215	59.7/40.3
Educational status		
Primary School	58	10.9
Secondary School	55	10.3
High School	211	39.6
College	41	7.7
University	151	28.3
Post Graduate	17	3.2
Marital status (married/not married/divorced)	313/185/35	58.7/34.7/6.6
Occupation		
Civil Servant	75	14.1
Worker	188	35.3
Self-employed	134	25.1
Unemployed	6	1.1
Retired	44	8.3
House wife	31	5.8
Student	54	10.1
Farmer	1	0.2

SD: standard deviation

Table 2. Identification of cardiac arrest findings

Procedures	Those who have received CPR training n (%)	Those who have not received CPR training n (%)	Total n (%)	p
Consciousness Evaluation				
No response when called*	122 (22.8)	183 (34.3)	305 (57.2)	
No response when touched*	85 (15.9)	99 (18.5)	184 (34.5)	
No movement*	87 (16.3)	98 (18.3)	185 (34.7)	
I do not know	13 (2.4)	24 (4.5)	37 (7.0)	0.068
Those knowing 3 of the procedures correctly	27 (5.0)	22 (4.1)	49 (9.2)	
Those knowing 2 of the procedures correctly	35 (6.5)	40 (7.5)	75 (14.1)	
Those knowing 1 of the procedures correctly	140 (26.2)	231 (43.3)	371 (69.7)	
Those who do not know any of the procedures	13 (2.4)	24 (4.5)	37 (7.0)	
Respiration evaluation				
No respiratory movement*	105 (19.6)	131 (24.5)	236 (44.3)	
No respiratory sound*	56 (10.5)	52 (9.7)	108 (20.3)	
No air coming out of the mouth of the victim*	60 (11.2)	83 (15.5)	143 (26.8)	
No steaming up of the mirror put in front of the mouth of the victim †	114 (21.3)	144 (27.0)	258 (48.4)	0.012
I do not know	70 (13.1)	117 (21.9)	187 (35.1)	
Those knowing three of the procedures correctly	28 (5.2)	16 (3.0)	44 (8.3)	
Those knowing two of the procedures correctly	20 (3.7)	30 (5.6)	50 (9.4)	
Those knowing one of the procedures correctly	97 (18.1)	155 (29.0)	252 (47.3)	
Those who do not know any of the procedures	70 (13.1)	117 (21.9)	187 (35.1)	
Circulation Evaluation				
No circulation sign*	38 (7.1)	39 (7.3)	77 (14.4)	0.054
I do not know	177 (33.2)	279 (52.3)	456 (85.6)	

*True reply †False reply CPR: cardiopulmonary resuscitation

CPR attitudes: The rate of the responses provided to the question "To whom do you apply CPR without hesitation?" was 90.6% for a family member, 76.5% for a friend, 95.9% for a neighbour and 42.5% for a stranger.

Concerns regarding CPR: The concerns regarding CPR application included "making a mistake" at a rate of 77.2%, "stopping a working heart" at a rate of 19.3%, "causing harm to organs" at a rate of 11.8%, "causing bone fractures" at a rate of 4.5%, "punishment because of legal reasons" at a rate of 6.3%, "contracting a contagious disease" at a rate of 8.2% and "contamination by blood or vomit" at a rate of 3.3%.

Discussion

This study is the first to investigate the knowledge, attitudes and concerns of society regarding CPR in Turkey.

According to the results obtained from a population having a high level of education in the western region of Turkey, the rate of people who received CPR training was found to be 40.3%. This rate may be lower in rural regions. Different countries have conducted several studies in their societies to determine the knowledge, attitudes and awareness regarding CPR. This rate was reported to be 69.4% in a study conducted in Slovenia; the researchers attributed this to the obligatory CPR training in driving schools in this country (10). However, although their CPR training rate was high compared with the other countries, the researchers found the rate of participation in knowledge update courses to be 2%, and they indicated that this rate was too low. CPR training rates in other countries were as follows: 21% in Hong Kong, 27% in New Zealand, 28% in Ireland, 35% in Japan, 58% in Australia, 64.1% in West Australia, 75% in Poland and 79% in Washington (12-18). These rates vary in the urban and rural regions of the countries. While the training rate in an urban region of Arizona was 63.2%, this rate fell to 55.4% in the rural region (19). Taking CPR training during driving schools is obligatory in some of these countries. BLS and first aid training are provided in health education courses during driving schools in Turkey. Further, 7.3% of participants stated that they received CPR training during a driving school in Turkey. Following this was receiving CPR training at courses given in the workplace, with a rate of 8.4%. It was made obligatory in the Law on Occupational Health and Safety No. 6331 in July 2013 in our country that one out of 10

Table 3. The evaluation of CPR application by those who witnessed cardiac arrest

	Those who have received CPR training n (%)	Those who have not received CPR training n (%)	Total n (%)	p
The rate of witnesses conducting only cardiac compression	9 (1.6)	4 (0.7)	13 (2.4)	
The rate of witnesses conducting only mouth to mouth ventilation	5 (0.9)	3 (0.5)	8 (1.5)	
The rate of witnesses conducting both cardiac compression and mouth to mouth ventilation	16 (3.1)	3 (0.5)	19 (3.6)	0.010
The rate of witnesses calling emergency services	15 (2.7)	23 (4.1)	38 (6.8)	

CPR: cardiopulmonary resuscitation

Table 4. The evaluation of the CPR knowledge of the participators

	Those who have received CPR training (n=212) (%)	Those who have not received CPR training (n=321) (%)	p
Opening airway	74 (13.8)	30 (5.6)	<0.001*
Controlling respiration	103 (19.3)	94 (17.6)	<0.001*
Mouth to mouth ventilation	97 (18.1)	50 (9.3)	<0.001*
Cardiac compression	127 (23.8)	62 (11.6)	<0.001*
Those who can conduct both cardiac compression and mouth to mouth ventilation together	113 (21.2)	40 (7.5)	<0.001*
Those who can conduct three of the procedures	42 (7.9)	4 (0.7)	<0.001*
Those who do not know any of the procedures	47 (8.8)	159 (29.8)	<0.001*

*p<0.05. CPR: cardiopulmonary resuscitation

employees working in a workplace receives a BLS certificate from courses that are approved by the Ministry of Health. The rate found in this study may be related to this number, and it may increase.

The rate of knowledge of cardiac arrest signs was found to be statistically higher in participants who have received CPR training than in those who have not received it. This result clearly shows that education is an important factor in recognizing cardiac arrest signs. However, the rate of knowledge of at least one cardiac arrest sign was 17.8, and this rate was reported to vary between 11.2% and 31.4% in studies conducted in different countries (10, 13). The rate of knowledge of cardiac arrest signs was reported to be 78% in a study conducted among teachers in Belgium (20). This high result demonstrates the effect of education. CPR training courses are found in the curricula of primary and secondary schools in countries such as Austria, Japan, Norway, Hong Kong and Singapore. In a study, the rate of willingness to begin CPR by citizens was found to be high in people having a high level of education and in those working at offices or jobs necessitating such skills (12). It was suggested by studies that these results are not related to the responsibility the citizens bear toward their workmates but are related to CPR awareness (12).

In this study, 35.5% of participants stated that they could perform only cardiac compression and 28.7% stated that they could perform both cardiac compression and mouth to mouth ventilation. These low rates may be because of the low rate of training and because of the lack of repeat BLS training courses. These results explain the low rate of CPR (3.6%) that was initiated by witnesses. In our study, 18.6% of participants stated that they had previously witnessed sudden cardiac arrest; however, 78% of them hesitated to apply CPR because they could not rely on their knowledge and were afraid to make a mistake. However, most participants stated that they volunteered to correct and improve their CPR knowledge and skills. In a survey study conducted in Japan, 19% of 1132 people were reported to have witnessed a collapse situation, and 4% of these began to apply CPR (12). In a survey study in which 357 people participated, the rate of receiving CPR training was 12%, and 10% of the participants stated that they had previously performed CPR. It was revealed in previous studies that in addition to increasing knowledge and practice, CPR training with repeat courses has a positive contribution to initiating CPR more willingly when a citizen witnesses a cardiac arrest (10, 12, 21).

When CPR practical application knowledge, such as compression application location, number, depth and rates of compression–ventilation, were evaluated, the rates were found to be significantly higher in participants having received CPR training than in those who had not received CPR training. Rajapakse et al. (10) reported that 1.2% of participants knew the correct number of compressions,

Table 5. The evaluation of CPR practical applications

	Those who have received CPR education (n=212) (%)	Those who have not received CPR education (n=321) (%)	Total (n=533) (%)	p
What is the chest compression rate?				
150/min†	14 (2.6)‡	6 (1.1)	20 (3.8)	
100/min*	71 (13.3)	27 (5.0)	98 (18.4)	<0.001
50/min†	88 (16.5)‡	64 (12.0)	152 (28.5)	
I do not know	42 (7.8)‡	221 (41.4)	263 (49.3)	
What is the rate of compression/mouth to mouth ventilation?				
5/1†	66 (12.3)	69 (12.9)	135 (25.3)	
15/2†	37 (6.9)	29 (5.4)	66 (12.4)	<0.001
30/2*	60 (11.2)‡	23 (4.3)	83 (15.6)	
Other	51 (9.5)‡	197 (36.9)	248 (46.5)	
Where is the location of chest compression application?				
Upper part of the chest†	20 (3.7)	29 (5.4)	49 (9.2)	
Middle of the chest*	125 (23.4)	152 (28.5)	277 (52)	<0.001
Lower part of the chest†	61 (11.4)	59 (11.0)	120 (22.5)	
I do not know	9 (1.6)‡	78 (14.6)	87 (16.3)	
What is the proper chest compression depth?				
At least, 1-2 cm†	74 (13.8)	70 (13.1)	144 (27.1)	
Moderate, 5-6 cm*	96 (18.0)	86 (16.1)	182 (34.3)	<0.001
Too much, 6-10 cm†	21 (3.9)	13 (2.4)	34 (6.4)	
As much as possible †	13 (2.4)‡	32 (6.0)	45 (8.5)	
I do not know	11 (2.0)‡	115 (21.5)	126 (23.7)	

*True reply, †False reply, ‡ p<0.05; significant difference with the true reply; chi-square test

2.2% knew the ventilation–compression rate and 13% knew the compression depth. However, the rates of knowledge of BLS procedures were not given according to training status but were given in general.

In the evaluation of CPR attitudes and concerns in societies, it was found that participants were reluctant to perform CPR because of contagious diseases and legal reasons in societies with high education levels (9, 15, 19, 22). Although CPR education rate was 70% within the last 5 years in Ireland, 16.6% of participants stated that in an urgent case, they would initiate CPR without the fear of lack of safety, being sued, or contracting infection (15). In a survey conducted in Arizona, participants specified that they were reluctant to perform CPR because of being afraid of making a mistake (22.8%), causing harm to the patient (19.3%) and legal reasons (17.7%) (19). In addition, according to the results of many studies, while the rates of participants stating that they could apply CPR without hesitation mostly to their families and friends is between 72% and 93.3%, the rates of participants stating that they could perform CPR on a stranger vary between 18% and 42% (16, 23). In our study, the response rate for the question regarding the people on which participants could perform CPR without hesitation was found to be 90.6% for someone from their family but 42.5% for a stranger, which is similar to the results of previous studies.

In a study conducted by Urban et al. (24), they highlighted that compressions were discontinued by both citizen and professional rescuers due to their unwillingness to perform mouth-to-mouth ventilation; therefore, they emphasized that more efforts must be made to increase education, and more rescuers must be educated using mass media in education, programs and videos. Atkins specified that CPR education must reach the masses with creative approaches in easy, accurate, rapid and inexpensive ways. The use of smartphones and tablet PCs, which are common communication instruments in today's world, must be developed to contribute to standard CPR education (21).

Our study has some limitations. One of these is that it was conducted only in the western region of Turkey and did not involve the whole country. Another limitation is that AED is available only in airports in our country. It is unavailable in public places such as subways, highways, football stadiums and large entertainment centres. Therefore, the participants were asked what they knew about AEDs but were not ques-

tioned about its detailed use. The answer to the question on what they knew about AEDs was "I have never heard of it" at a rate of 58.5%. It can be suggested that the participants who said "yes" to the question "Do you have any idea about where an AED is found?" (21.8%) might have answered this question inaccurately because they confused AEDs with defibrillators that are available in hospitals.

Conclusion

The knowledge and awareness level of CPR among adults in society can be increased by generalising CPR training to the public; by this means, the rate of witnesses who start CPR can be raised. Repeating this training at certain intervals will reinforce CPR training in society. To do this, the campaigns raising awareness of CPR training should be increased. A campaign targeted to raise awareness of cardiac arrest in society was started at the request of the European Parliament and ERC on 16th October 2014 in Turkey. It is planned to continue this campaign for 2 years.

Ethics Committee Approval: Ethics committee approval was received for this study from the ethics committee of Dokuz Eylül University Faculty of Medicine.

Informed Consent: "Patients" are not included in our study, so "patient consent" is not available.

Peer-review: Externally peer-reviewed.

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References

1. Püttgen HA, Pantle H, Geocadin RG. Management of cardiac arrest patients tomaximize neurologic outcome. Curr Opin Crit Care 2009; 15: 118-24. [CrossRef]
2. Berdowski J, Berg RA, Tijssen JG, Koster RW. Global incidences of out-of-hospital cardiac arrest and survival rates: Systematic review of 67 prospective studies. Resuscitation 2010; 81: 1479-87. [CrossRef]
3. Ambulance service association, the joint royal college ambulance liaison committee. National Out-of-hospital Cardiac Arrest (OHCA) project. 2006.
4. Roger VL, Go AS, Lloyd-Jones DM, Adams RJ, Berry JD, Brown TM, et al. Heart disease and stroke statistics--2011 update: a report from the American Heart Association. Circulation 2011; 123: e18-e209. [CrossRef]
5. Day JC. Population projections of the United States, by age, sex, race, and hispanicorigin: 1992 to 2050. In: US Bureau of the Census, current population reports. Washington, DC: US Government Printing Office; 1992; 25-1092.
6. Berdowski J, Blom MT, Bardai A, Tan HL, Tijssen JG, Koster RW. Impact of onsite or dispatched automated external defibrillator use on survival after out-of-hospital cardiac arrest. Circulation 2011; 124: 2225-32. [CrossRef]
7. McNally B, Robb R, Mehta M, Vellano K, Valderrama AL, Yoon PW, et al. Out-of-hospital cardiac arrest surveillance --- Cardiac Arrest Registry to Enhance Survival (CARES), United States, October 1, 2005--December 31, 2010. MMWR Surveill Summ 2011; 60: 1-19.
8. Sasson C, Rogers MA, Dahl J, Kellermann AL. Predictors of survival from out-of-hospital cardiac arrest: a systematic review and meta-analysis. Circ Cardiovasc Qual Outcomes 2010; 3: 63-81. [CrossRef]
9. Bradley SM, Rea TD. Improving bystander cardiopulmonary resuscitation. Curr Opin Crit Care 2011; 17: 219-24. [CrossRef]
10. Rajapakse R, Noč M, Kersnik J. Public knowledge of cardiopulmonary resuscitation in Republic of Slovenia. Wien Klin Wochenschr 2010; 122: 667-72. [CrossRef]
11. Nolan JP, Soar J, Zideman DA, Biarent D, Bossaert LL, Deakin C, et al. European Resuscitation Council Guidelines for Resuscitation 2010 Section 1. Executive summary. Resuscitation 2010; 81: 1219-76. [CrossRef]
12. Kuramoto N, Morimoto T, Kubota Y, Maeda Y, Seki S, Takada K, et al. Public perception of and willingness to perform bystander CPR in Japan. Resuscitation 2008; 79: 475-81. [CrossRef]
13. Chair SY, Hung MS, Lui JC, Lee DT, Shiu IY, Choi KC. Public knowledge and attitudes towards cardiopulmonary resuscitation in Hong Kong: telephone survey. Hong Kong Med J 2014; 20: 126-33.
14. Larsen P, Pearson J, Galletly D. Knowledge and attitudes towards cardiopulmonary resuscitation in community. N Z Med J 2004; 117: 870.
15. Jennings S, Hara TO, Cavanagh B, Bennett K. A national survey of prevalence of cardiopulmonary resuscitation training and knowledge of the emergency number in Ireland. Resuscitation 2009; 80: 1039-42. [CrossRef]
16. Celenza T, Gennat HC, O'Brien D, Jacobs IG, Lynch DM, Jelinek GA. Community competence in cardiopulmonary resuscitation. Resuscitation 2002; 55: 157-65. [CrossRef]
17. Rasmus A, Czekajlo MS. A national survey of the Polish population's cardiopulmonary resuscitation knowledge. Eur J Emerg Med 2000; 7: 39-43. [CrossRef]
18. Sipsma K, Stubbs BA, Plorde M. Training rates and willingness to perform CPR in King Country, Washington: a community survey. Resuscitation 2011; 82: 564-7. [CrossRef]
19. Coons SJ, Guy MC. Performing bystander CPR for sudden cardiac arrest: behavioral intentions among the general adult population in Arizona. Resuscitation 2009; 80: 334-40. [CrossRef]
20. Mpotos N, Vekeman E, Monsieurs K, Derese A, Valcke M. Knowledge and willingness to teach cardiopulmonary resuscitation: a survey amongst 4273 teachers. Resuscitation 2013; 84: 496-500. [CrossRef]
21. Dianne DL. Bystander CPR: How to best increase the numbers. Resuscitation 2012; 83: 1049-50. [CrossRef]
22. Taniguchi T, Sato K, Fujita T, Okajima M, Takamura M. Attitudes to bystander cardiopulmonary resuscitation in Japan in 2010. Circ J 2012; 76: 1130-5. [CrossRef]

23. Jelinek GA, Gennat H, Celenza T, O'Brien D, Jacobs I, Lynch D. Community attitudes towards performing cardiopulmonary resuscitation in Western Australia. Resuscitation 2001; 51: 239-46. [CrossRef]

24. Urban J, Thode H, Stapleton E, Singer AJ. Current knowledge of and willingness to perform Hands-Only CPR in laypersons. Resuscitation 2013; 84: 1574-8. [CrossRef]

Appendix 1. Questionnaire given to the participants

You are expected to answer the questions in the following questionnaire for the study titled "Evaluation of Public Awareness, Knowledge, and Attitudes About Cardiopulmonary Resuscitation; Report of Izmir".

The aim of our study is to determine the knowledge levels and attitudes of people living in the district of Balçova in İzmir about cardiac arrest and actions to be taken in this situation. Our other purpose is to increase awareness of the issue. THIS FORM DOES NOT CONSTITUTE AN EXAM. Your feeling of being comfortable with regard to this will reflect general practice levels accurately. THEREFORE, YOUR NAME IS NOT ASKED AND WE KINDLY ASK YOU NOT TO WRITE YOUR NAME. We thank you for your willingness to participate in our survey and for your contributions to the education of our society and to the development of medical science.

A- Demographic information:

Please state your age:

Please state your gender: ☐ Male ☐ Female

Please state your marital status: ☐ I am married ☐ I am not married ☐ I am divorced

Please state your educational status: ☐ Primary school ☐ College
☐ Secondary School ☐ University
☐ High School ☐ Post graduate

Please state your occupation: ☐ Civil Servant ☐ Retired
☐ Worker ☐ House wife
☐ Self-employed ☐ Student
☐ Unemployed ☐ Farmer

1) Which of the following may be a sign of sudden cardiac arrest? (You can mark more than one option)

☐ Loss of consciousness (the individual appearing to have fainted)
☐ Discontinuation of breathing (respiratory standstill)
☐ Discontinuation of circulation (the heart sound not being heard or not feeling the pulse)
☐ Cyanosis
☐ Nausea
☐ Difficulty in breathing
☐ Chest pain
☐ Faintness of the skin
☐ The individual is not moving
☐ Other

2) How can the consciousness state of the individual be determined? (You can choose more than one option)

☐ No response when called
☐ No response when touched
☐ Not moving at all
☐ I do not know

3) How can the absence of respiration be determined? (You can choose more than one option)

☐ Not having any respiratory movement
☐ Not having any respiratory sound
☐ Not coming air out of the mouth of individual
☐ Not steaming up a mirror placed in front of the mouth of individual
☐ I do not know

4) How can the absence of circulation be determined? (You can choose more than one option)

☐ The lack of circulation signs
☐ Not feeling a pulse in the vessels of the neck
☐ Not feeling a pulse in the vessels of the arm
☐ I do not know

5) Have you ever witnessed a sudden death? If yes, who was he/she? (You can choose more than one option)

☐ Somebody from my family
☐ Somebody from my friends or acquaintances
☐ A stranger
☐ I have not seen this

6) If you have witnessed such an event, what did you do in the situation? (If you replied no to the 4th question, skip this question) (You can choose more than one option)

☐ I began to give cardiac massage
☐ I conducted mouth to mouth ventilation (I respirated)
☐ I both gave cardiac massage and conducted mouth to mouth ventilation (I gave CPR)
☐ I called an ambulance (112)
☐ I told somebody to call for help
☐ I called for help by telephone
☐ I just watched and left

7) What do you think a "cardiac massage" means?

☐ To scrub the chest at certain intervals
☐ To apply strong compression to the chest at certain intervals (compress)
☐ To scrub the heart directly opening the chest wall
☐ To apply compression directly to the heart opening the chest wall
☐ I have no idea

8) If sudden death occurs in the following people, for whom would you conduct respiration and give cardiac massage? (You can choose more than one option)

☐ Someone from the family
☐ Your friend
☐ Your neighbour
☐ A youth in the sports hall
☐ A stranger in the supermarket
☐ A person who has poor personal hygiene at the bus stop
☐ A gamin who is drug dependent and uses glue, hashish and heroin

9) If somebody from among your family members or friends felt faint (sudden death) what would you do?

☐ I would begin to give cardiac massage
☐ I would call an ambulance (112)
☐ I would call somebody or call for help
☐ I would just watch and leave

10) What would you do if you witness a stranger feeling faint (sudden death)?

☐ I would begin to give cardiac massage
☐ I would call an ambulance (112)
☐ I would call somebody or call for help
☐ I would just watch and leave

11) What concerns may prevent you from giving cardiac massage to your friends or relatives?

☐ Making a mistake
☐ Causing bone fractures
☐ Causing harm to organs
☐ Stopping a working heart
☐ Punishment due to legal reasons
☐ Contamination by blood or vomit
☐ Contracting a contagious disease
☐ Other

12) What concerns may prevent you from giving cardiac massage to a stranger?

☐ Making a mistake
☐ Causing bone fractures
☐ Causing harm to organs
☐ Stopping a working heart
☐ Punishment due to legal reasons
☐ Contamination by blood or vomit
☐ Contracting a contagious disease
☐ Other

13) Do you know how to give cardiac massage in the case of cardiac arrest and respiratory standstill (namely, sudden death)?

☐ Yes
☐ No

14) Have you received any training in this subject? (Basic Life Support training)

☐ Yes
☐ No

15) If your reply is yes to the above question, where did you receive the training?

☐ At school
☐ At university
☐ During my military service
☐ During the driving school
☐ At a Resuscitation Society course
☐ At a course given by the trainers of the Ministry of Health
☐ At a course given by the municipality
☐ In a sports club
☐ At a course given in the workplace
☐ Television-Internet-Media
☐ Other

16) If you are confronted with a person whose heart has stopped, which of the Basic Life Support applications can you apply? (You can choose more than one option)

☐ I can open the airway
☐ I can control respiration
☐ I can ventilate/conduct mouth to mouth ventilation (kiss of life)
☐ I can give cardiac massage
☐ I can both ventilate and give cardiac massage
☐ I do not know

17) What is the proper rate of cardiac massage/artificial ventilation during cardiac massage?

☐ 5/1
☐ 15/2
☐ 30/2
☐ Other

18) Which area must cardiac massage be applied on?

☐ Upper part of the chest
☐ Middle of the chest
☐ Lower part of the chest
☐ Other

19) What must be the rate of the cardiac massage?

☐ At least 150 times per minute
☐ At least 100 times per minute
☐ At least 50 times per minute
☐ I do not know

20) How much force must be applied during heart massage?

☐ Enough that the rib cage moves down 1 to 2 cm
☐ Moderate force, such that the rib cage moves down 5 to 6 cm
☐ High force, such that the rib cage moves down 6 to 10 cm
☐ As much force as possible
☐ Other

21) What do you know about the device defined as a "defibrillator" that is used during cardiac massage when necessary? (You can choose more than one option)

☐ I have never heard of it
☐ I have heard of it before but have not seen it
☐ It is a device supporting respiration
☐ It is a device to restart a heart that has stopped working

22) Do you have any idea about where an "Automated External Defibrillator" or "Pace Maker" can be found?

☐ Yes
☐ I do not know